



# State of Utah

## DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER QUALITY

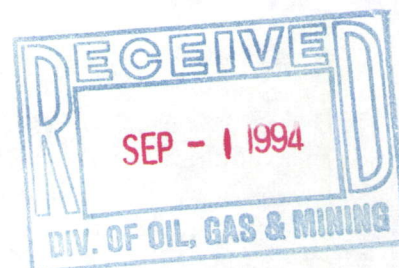
Michael O. Leavitt  
Governor

Dianne R. Nielson, Ph.D.  
Executive Director

Don A. Ostler, P.E.  
Director

288 North 1460 West  
P.O. Box 144870  
Salt Lake City, Utah 84114-4870  
(801) 538-6146  
(801) 538-6016 Fax  
(801) 536-4414 T.D.D.

August 26, 1994



Mr. Glen Eurick  
Environmental Affairs Coordinator  
Barrick Mercur Gold Mine  
P.O. Box 838  
Tooele, Utah 84074

Re: Stipulation and Consent Order No. GW90-03-A;  
Arsenic Neutralization of Heap Leach

Dear Mr. Eurick:

We have reviewed your August 15, 1994 request for approval to utilize ferric sulfate enriched tailings reclaim water to rinse Valley Fill Leach Area 2 (VF2) in order to affect arsenic reduction in Area 2 leachate. We have also received the supplemental information delivered to our office on August 24, 1994. This proposal was reviewed in the context of paragraph 3 of the order portion of the above referenced Stipulation and Consent Order. Prior to this proposal Barrick has rinsed VF2 with tailings reclaim water followed briefly with fresh water rinsing and then natural precipitation. These prior rinsings were successful in bringing the leachate concentrations of cyanide down to less than 1 mg/l. However these prior rinsing have not been effective in significantly reducing concentrations of arsenic and selenium in leachate solutions. Also noted from our analysis of the monthly leakage collection data are the continued high levels of TDS, sulfate and nitrate.

Having reviewed your proposal and the literature provided it is possible that the proposed process may reduce the long term concentrations of arsenic and selenium in leachate solutions. The use of ferric sulfate to precipitate insoluble ferric arsenate in aqueous solutions is a proven technology. Your attempt to use this process, on piled spent ore in a heap leach, is experimental and may or may not prove beneficial. Because there does not appear to be any potential detrimental side effects or risks to the environment and because the experiment could prove to be highly beneficial we approve your proposal subject to the following conditions:

- 1- No more than 20 feet of solution may be impounded on the primary pond bottom liner.
- 2- Unexpected significant increases in contaminant concentrations for any parameter in the process waters, that the Executive Secretary determines to have a potential detrimental impact on the environment, will be cause to revoke approval for this experiment.

The monitoring provisions of the work plan submitted under paragraph 3 of the Consent Order with respect to flow monitoring and sampling analysis remain in effect. However, in order for us to evaluate the effectiveness of the ferric sulfate rinsing the following additional monitoring provisions are suggested:



Mr. Glen Eurick  
August 26, 1994  
Page 2

1- During the rinsing process, a minimum of 2 times a month, samples of leakage collection and cistern data should be sent to an offsite laboratory for complete inorganic analysis consistent with the sampling and analysis performed under the ground water permits for Area 3 and the tailings pond and in accordance with the Quality Assurance Project Plan approved for those permits. This data should be reported to our office on a monthly basis.

2- Upon termination of rinsing, monthly sampling and analysis of cistern and leakage collection samples should be sent to an offsite laboratory for complete inorganic analysis consistent with the sampling and analysis performed under the ground water permits for Area 3 and the tailings pond and in accordance with the Quality Assurance Project Plan approved for those permits. This data should be reported to our office on a quarterly basis.

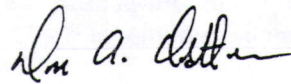
Your proposal was not specific with respect to reagent application concentrations. Because the literature data indicates that arsenic compounds precipitated at high Fe/As molar ratios are more stable than those formed at lower molar ratios we suggest a minimum 6:1 molar ratio or a ferric concentration in the rinsate solution of no less than 30 mg/l.

We are impressed that Barrick has proposed this innovative experiment to affect insitu metals stabilization at Valley Fill Area 2. We hope this effort will be successful in further protecting ground water at the site from potential degradation due to long term leaching of solutions through the spent ore and into the underlying aquifers. As an element of the overall closure approach this experiment may provide benefits both in the short term for this closure and in the long term for the mining industry in general.

If you have any questions concerning the above approval or the conditions of the approval please feel free to contact myself or Dennis Frederick at 801-538-6146.

Sincerely,

Utah Water Quality Board



Don A. Ostler, P.E.  
Executive Secretary

DAO:DAF:wfm

cc: Utah County Health Department  
Tooele County Health Department  
J.B.Brown, Dames and Moore  
Wayne Hedberg, DOGM  
Brian Buck, JBR Consultants Group